

IN THE CLAIMS:

Please cancel claims 1 to 20.

Please add the following new claims:

21. (New) A method for establishing at least a limit value (tmax) for at least a first operational parameter of a nuclear reactor having a core, in which fuel assemblies are loaded, the fuel assemblies having fuel rods each comprising pellets of nuclear fuel and a cladding which surrounds the pellets the method comprising:

simulating at least a transient operational occurrence of the nuclear reactor;

calculating a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding; and

establishing as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding.

22. (New) The method according to claim 21, further comprising:

establishing the failure value for the physical quantity which characterizes a failure of the cladding before the step of simulating at least a transient operational occurrence of the nuclear reactor.

23. (New) The method according to claim 22, wherein the step of establishing the failure value for the physical quantity which characterizes a failure of the cladding before the step of simulating at least a transient operational occurrence of the nuclear reactor comprises

subjecting the fuel rods to gradients of nuclear power;

calculating the values reached by the physical quantity in at least the cladding which has failed during a power gradient; and

selecting a minimum value from the values reached by the physical quantity.

24. (New) The method according to claim 23, wherein the value which characterizes the failure is equal to the minimum value.

25. (New) The method according to claim 23, wherein the values which characterize the failure is equal to the minimum value and corrected by a factor which represents an operating mode of the reactor.

26. (New) The method according to claim 21, further comprising:

establishing at least a fuel rod which has a cladding that is the most stressed during the transient occurrence before the step of simulating at least the transient operational occurrence; and

that the step of calculating a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding is carried out for one of the and each rod which is established.

27. (New) The method according to claim 26, wherein the step of establishing at least a fuel rod which has a cladding that is the most stressed during the transient occurrence before the step of simulating at least the transient operational occurrence comprises the subsidiary steps of:

evaluating the value reached by the physical quantity in the claddings of a plurality of the fuel rods; and

selecting, as the rod whose cladding is the most stressed, a highest value of values determined in the step of evaluating the value reached by the physical quantity in the claddings of a plurality of the fuel rods.

28. (New) The method according to claim 21 wherein the first operational parameter is a power per unit length (PLIN) supplied by a fuel rod.

29. (New) The method according to claim 21, wherein the first operational parameter is a period of time for operation of the reactor at an intermediate power less than its nominal power (PN).

30. (New) The method according to claim 21, wherein the limit value is a limit value for triggering an emergency shutdown of the reactor.

31. (New) The method according to claim 30, further comprising:

establishing a limit value for triggering an alarm from the limit value for an emergency shutdown established in the step of establishing as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding.

32. (New) The method according to claim 21, wherein the step of simulating at least a transient operational occurrence is carried out for at least an operating mode of the reactor selected from the group constituted by:

an operating mode at a total power of the reactor equal to the reactors nominal power,

an extended operating mode at intermediate power, in which the total power of the reactor is less than the reactors nominal power over a period of time of at least 8 hours per period of 24 hours,

a continuous network operating mode, in which the total power varies alternatively around a high power (PN; PE) and around a low power (PR), and

a primary control operating mode, in which the total power of the reactor varies by from 0 to 5% around a reference value between 95 and 100% of the nominal total power of the reactor.

33. (New) The method according to claim 32, wherein for at least an operating mode, the steps of simulating at least a transient operational occurrence of the nuclear reactor; calculating a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding; and establishing as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding, are used for another operating mode with, as the failure value of the physical quantity, the failure value of the other operating mode corrected by a corrective value.

34. (New) The method according to claim 21, wherein the transient occurrence simulated is a transient occurrence of one of:

an excessive increase in load, an uncontrolled removal of at least a group of control clusters, one of the control clusters falling.

35. (New) The method according to claim 21, wherein the physical quantity is one of a stress and a function of stress(es) in the cladding.

36. (New) The method according to claim 21, wherein the physical quantity is a deformation energy density in the cladding.

37. (New) A system for establishing at least a limit value for an operational parameter of a nuclear reactor (2), comprising:

an arrangement to simulate at least a transient operational occurrence of the nuclear reactor;

an arrangement to calculate a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding; and

an arrangement to establish as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding.

38. (New) The system according to claim 37, characterized in that the system comprises at least a computer and a storage arrangement, in which at least a program for carrying out steps of simulating at least a transient operational occurrence of the nuclear reactor, calculating a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding, and establishing as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding is stored.

39. (New) An article of manufacture, comprising:

an arrangement configured to perform the steps of a method for establishing at least a limit value (t_{max}) for at least a first operational parameter of a nuclear reactor having a core, in which fuel assemblies are loaded, the fuel assemblies

having fuel rods each comprising pellets of nuclear fuel and a cladding which surrounds the pellets the method comprising, simulating at least a transient operational occurrence of the nuclear reactor, calculating a value reached by a physical quantity during the transient operational occurrence in at least the fuel rod cladding; and establishing as a limit value, the value of the first operational parameter when the value calculated by the physical quantity corresponds to a value for the physical quantity which characterizes a failure of the cladding.

40. (New) The article of manufacture according to claim 39, wherein the article of manufacture can be used in a computer.